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(54) CAMERA

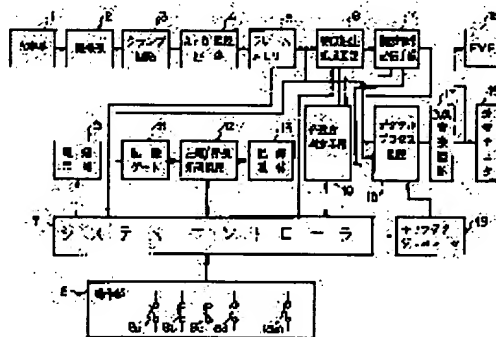
(57)Abstract:

PURPOSE: To provide a camera by which intended accurate composition is easily set when the composition of an object is set.

CONSTITUTION: In a camera recording an object video signal introduced from an image pickup system 2 such as a CCD to a recording medium 13 such as a magnetic medium or a semiconductor element, reference composition obtained by a characteristic extract circuit 9 and a composition of a current object are displayed superimposingly onto an EVF 18. When a coincidence discrimination means 10 discriminates that the reference composition and the composition of the video image of the current object are coincident, a

compression/expansion processing circuit 11

compresses the object video signal based on the composition and the compressed signal is recorded on a recording medium 13.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] A photography person displays in detail a camera and the composition decided beforehand on the finder of a camera, or an external monitor, and this invention determines the composition of photography with reference to the decided composition, and relates to the camera which takes a photograph.

[0002]

[Description of the Prior Art] The technique indicated by the display of the camera indicated by JP, 4-139428, A etc. as a Prior art which displays the information about composition on a finder or a monitor is known. In the display of this camera, the indicator of the criteria location for a composition setup displayed by the display means can be moved to the arbitrary locations on a finder screen with a migration means, and the composition of photography of this criteria location to a standard can be decided. Moreover, in the display of this camera, a display rectangle can be set up about main photographic subjects, the display selection pattern which makes that range a standard or is prepared beforehand can be chosen, and the composition of photography of that display pattern to a standard can be decided.

[0003]

[Problem(s) to be Solved by the Invention] However, in the display of the camera indicated by said JP, 4-139428, A, when setting up the criteria location for deciding composition, the photography person used the migration means, the criteria location had to be directed manually, or the display rectangle or the display pattern had to be directed on the finder, and there was fault that the instancy nature on actuation was missing.

[0004] Moreover, though a photograph can be taken in the composition whose intention the photography person had roughly when requesting photography from other men and composition is specified and requested with the range assignment by the dot or the line, or a display selection pattern, the case which does not agree in the composition which the photography client meant, and accuracy is possible. Furthermore, by this approach, since only the criteria location was shown to the last, whenever the photography person changed, gap of composition may have been completed delicately.

[0005] This invention sets it as one purpose to offer the camera which faces and can set up the exact composition to mean easily for being made in order to solve above-mentioned fault, and setting up the composition of a photographic subject. Moreover, it sets it as other one purpose to offer the camera which faces and can set up the composition to mean correctly based on quantitative distinction for

setting up the composition of a photographic subject.

[0006]

[Means for Solving the Problem and its Function] An image pick-up means by which one camera of this invention changes into a video signal the image of the photographic subject in which image formation was carried out by optical system, The composition information storage means for memorizing the composition information concerning the image of the reference composition which is the camera equipped with the record means which carries out the record medium of the video signal outputted from this image pick-up means, and serves as criteria at the time of the photography record concerned, It has a display-control means to make a graphic display means indicate the image of the composition information memorized by this composition information storage means by superposition with the image of the photographic subject by the video signal currently outputted from the above-mentioned image pick-up means. ** which can determine the composition of the photographic subject concerned which should carry out image pick-up record with the above-mentioned image pick-up means and a record means while referring to the image of the composition information by which it was indicated [above-mentioned] by superposition in the above-mentioned camera.

[0007] An image pick-up means by which other one camera of this invention changes into a video signal the image of the photographic subject in which image formation was carried out by optical system, The composition information storage means for memorizing the composition information concerning the image of the reference composition which is the camera equipped with a record means to record the video signal outputted from this image pick-up means on a record medium, and serves as criteria at the time of the photography record concerned, A display-control means to make a graphic display means indicate the image based on the composition information memorized by this composition information storage means by superposition with the image of the photographic subject by the video signal outputted from the above-mentioned image pick-up means, It faces determining the composition of the photographic subject concerned which should carry out photography record with the above-mentioned image pick-up means and a record means, referring to the image of the composition information by which it was indicated [above-mentioned] by superposition, and has an agreement judging means for judging extent of agreement with the image of the composition information, and the composition of an actual photographic subject. In the above-mentioned camera, in case the composition of the photographic subject concerned which should carry out photography record with the above-mentioned image pick-up means and a record means is set up referring to the image of the composition information by which it was indicated by superposition with the display-control means, it can determine in consideration of the judgment result which shows extent of the image of the above-mentioned composition information, and the composition of an actual photographic subject.

[0008]

[Example] Hereafter, with reference to drawing etc.; the example of this invention is explained in detail. Drawing 1 is the block block diagram of the camera in which the 1st example by this invention is shown. In addition, let the camera of this example be the electronic "still" camera which can incorporate photographic subject image information by the image pick-up system which uses an image sensor.

[0009] As shown in drawing 1 , in the camera of this example, the photographic

subject image image formation was carried out [the image] by optical system 1 is changed into a video signal by the image pick-up system 2 as an image pick-up means using an image sensor. After this video signal is supplied to a clamping circuit 3 and predetermined potential clamps pedestal level, A/D conversion of it is carried out by the A/D-conversion circuit 4.

[0010] Once the changed digital signal is inputted into a frame memory 5, after processing, it is changed by the D/A conversion circuit which is a graphic display means, and is displayed on EVF18 or the external monitor 19 of the electronic viewfinder which is a graphic display means in the digital process circuit 15. On the other hand, it is recorded on the record media 13, such as a memory card which consists of semi-conductor modules, such as SRAM, after processing in the record gate 11 and compression/expanding circuit 12 which constitute a record means. The processing to **** is the same as processing of the conventional common electronic "still" camera.

[0011] Moreover, the feature extraction of an image is made in the feature-extraction processing circuit 9 so that it may explain in full detail later, and the image information memorized by the frame memory 5 is memorized as composition information with the composition information storage means 14. This composition information is the information concerning the reference composition used as the criteria for deciding the composition of a photography record image, and is hereafter indicated to be reference composition information. *

[0012] This reference composition information is changed by the D/A conversion circuit 17 after processing in the above-mentioned digital process circuit 15, and, EVF18 of an electronic viewfinder or the reference composition of criteria of deciding composition to be the external monitor 19, and in the case of this example, is displayed as composition shown with a border line. The photographic subject image of the real time currently outputted from the above-mentioned image pick-up system 2 is also then superimposed and displayed, and referring to the superposition screen, a photography person will perform photography, if having agreed in the agreement judging which adjusts the photography screen composition of a camera and mentions later is reported so that the above-mentioned photographic subject image may agree in the composition of a border line.

[0013] Moreover, the information which shows the description extracted from the photographic subject video signal of real time in the feature-extraction processing circuit 9, i.e., photographic subject composition information, is compared with reference composition information in the judgment means 10 for judging agreement with the image using the composition information memorized by the image and the composition information-storage means 14 by this, i.e., reference composition information, and the judgment of the agreement condition as composition is made. The judgment result is reported by the information means 6 by voice thru/or display, and photography is permitted.

[0014] Although a system controller 7 controls each above-mentioned control member, it contains a display-control means to perform EVF18 or control to which the image of a photographic subject and the image of composition information are superimposed and displayed on the external monitor 19, the control means which controls information actuation of the information means 6, a storage control means to perform control which writes composition information in the composition information storage means 14, etc. Moreover, the actuation signal of the control unit 8 which consists of switch groups operated by the photography person is inputted into this

system controller 7, and various kinds of directions are given to it.

[0015] The 1 or 2nd step release switches 8a and 8b for photography, composition display switch 8c as a display selection operating member for a composition information display, and composition elimination switch 8d as an operating member for elimination which directs elimination of the memorized composition information are built in the control unit 8. However, composition selecting-switch 8e currently illustrated by drawing 1 presupposes that it is unnecessary in this example.

[0016] Next, processing in the above-mentioned feature-extraction processing circuit 9, the composition information storage means 14, the agreement judging means 10, compression/expanding circuit 12, and the digital process 15 is explained to a detail, respectively. First, the above-mentioned feature-extraction processing circuit 9 is a block which performs processing which extracts the description information on the image as composition information concerning the reference composition which serves as criteria when determining composition as compared with the photographic subject image of real time at the time of reception and photography record in the digital signal outputted from the frame memory 5 from a video signal. This extract processing is processing which asks for the binary-ized data which are obtained by binary-ized processing of threshold processing of the digital signal outputted from the frame memory 5 by the well-known approach in the case of this example.

[0017] And the description information from which the **** was extracted is stored as the composition information which starts reference composition with the composition information storage means 14, i.e., reference composition information. For the sake of the convenience displayed on EVF18 thru/or the external monitor 19, the processing[threshold]-, i.e., binary-izing, processed above-mentioned reference composition serves as the composition information on a digital border line that only the part of the maximum outline of the black field made binary or a white field was extracted so that it may attach distinction with an actual photographic subject. Drawing 3 shows Screen G1 in which the composition of the border line which is the reference composition information extracted from the photographic subject video signal is shown.

[0018] In addition, it is also possible to apply the processing which extracts brightness information (Y-signal component) from a video signal as a modification of the above-mentioned feature-extraction processing as composition information acquired by the feature extraction, and the processing which extracts chroma signaling information (C signal component) from a video signal.

[0019] First, in the feature-extraction processing which extracts brightness information, the video signal acquired by the image pick-up means is divided into a Y-signal component and C signal component, only the Y signal of them is extracted, and the image information only by brightness data is treated as reference composition information. When the reference composition is displayed on EVF etc., it will be displayed as a monochrome image.

[0020] Moreover, in the feature-extraction processing which applies C signaling information, only C signal component is extracted among the video signals incorporated by the image pick-up means, and it is treated as reference composition information. In this case, constant value shall be applied to the brightness of a unit pixel. Therefore, when it displays on EVF etc. as reference composition, the brightness of a full screen serves as a fixed color screen.

[0021] In addition, it is also possible to apply the photographic subject video

signal itself as description information on the above-mentioned video signal. However, a video signal is applied to reference composition information in this case, and since both distinction will stop being attached easily if reference composition and the photographic subject image of real time are superimposed and displayed on EVF etc., it is necessary to change the processing property of both at the time of making it display. That is, for example, it is a filtering property, gain characteristics, etc., and it is important to change a processing property into extent which both can distinguish.

[0022] The judgment means 10 is a block which performs agreement judging processing in which compare the reference composition information used as the criteria concerned stored in the composition information storage means 14 with the photographic subject composition information by which the feature extraction was carried out from the actual photographic subject image currently outputted to real time, and which is mentioned later, and the agreement condition of both composition is judged whenever [above-mentioned agreement].

[0023] When reference composition information is binary-sized data, the photographic subject composition information on the real time applied to the above-mentioned agreement judging performs binary-sized processing of threshold processing of the digital data outputted by the feature-extraction processing circuit 9 from the frame memory 5 like the above-mentioned reference composition information on real time, is searched for, and is shown by the composition information on a border line as well as reference composition information. Therefore, it will be confirmed whether the above-mentioned agreement judging processing compares the border-line data and the border-line data of photographic subject composition information based on the binary-sized data of reference composition information, and its location on the screen of a border line corresponds.

[0024] You may make it judge with having agreed, when the judgment of actual agreement judged that the case where the binary-sized data of current photographic subject composition, i.e., a border line, became equal with the binary-sized data of reference composition, i.e., a border line, completely agreed, or gave tolerance to the binary-sized data of reference composition and the binary-sized data of photographic subject composition were within the limits of it. Furthermore, you may judge with the pattern-matching means between the binary-sized images based on border-line data. This agreement judging result is reported to EVF18 or the external monitor 19 by a display or voice through the information means 6, as mentioned above, and record of an image is permitted after that.

[0025] In addition, when the composition information concerning the reference composition stored in the composition information storage means 14 is a Y signal, each level of the Y signal which is the reference composition information, and the Y signal of current photographic subject composition is compared, and an agreement judging is performed. And if the actual Y-signal level of photographic subject composition turns into the same level on the Y-signal level of reference composition completely, or tolerance is given to the Y-signal level of reference composition and the Y-signal level of actual photographic subject composition is within the limits of it in case the agreement is judged, it will be judged with having agreed.

[0026] The above-mentioned compression/expanding processing circuit 12 is a block which performs a data compression or expanding processing for the current photographic subject composition data obtained by the agreement judging means 10

using well-known JPEG (JOINT PICTURE EXPERT GROUP) compression technology.

[0027] Processing for making various kinds of displays made from the above-mentioned digital process section 15 with the reference composition by which the feature extraction was mainly carried out, the actual photographic subject composition currently outputted on real time, and a character generator 16 compound on the display means of the above-mentioned EVF18 grade is performed. In addition, the signal by which synthetic processing was carried out is returned to an analog signal by the D/A conversion circuit 17, and is outputted to EVF18 grade.

[0028] In addition, although what extracts a luminance signal or a chroma signal and is applied to reference composition information as a modification of the above-mentioned feature-extraction processing was proposed, since it becomes impossible to approve as display brightness when superimposing and displaying reference composition and the photographic subject composition of real time in the case of this modification when brightness data as it is are added, it will display on EVF etc. by one half of the brightness of the aggregate value both brightness.

[0029] Next, the decision and photography actuation using the reference composition information in the camera of this example constituted as mentioned above of photography composition are explained using drawing having shown the EVF display screen of the flow chart of drawing 2, and the camera of drawing 3 - drawing 6. When a camera is in a movie through condition, i.e., the condition in which image pick-up record is possible, the processing to which reference composition information is displayed on EVF18 thru/or the external monitor 19 can be first chosen by composition display switch 8c (step S12). If whether composition information is memorized checks for the composition information storage means 14 (step S13) and it is not memorized when a display is chosen, it warns and returns to step S12 (step S14). If composition information is memorized, the reference composition information is the reference composition screen G1 of a border line like drawing 3 on a finder thru/or an external monitor. It superimposes and displays on the photographic subject image incorporated now (step S15).

[0030] Then, a composition elimination switch 8d condition is checked at step S16. The processing which eliminates the reference composition information in which it is indicated by current by actuation of the switch can be chosen (step S16). When elimination is chosen, the reference composition information memorized by the composition information storage means 14 is eliminated, and the display of reference composition also disappears (step S17).

[0031] The actuation condition of 1st step release switch 8a is checked at step S18 after the display of the above-mentioned reference composition, or elimination processing. When a switch is not operated, if the display condition of reference composition is checked and it is under display, it will return to step S16, but if it is not [be / it] under display, it will return to step S12.

[0032] In addition, although the photography person itself is the part which can carry out actuation selection at arbitration, an above-mentioned display or elimination processing When actuation of the display switch mentioned above or an elimination switch is performed Processing of the usual camera actuation (automatic focus processing), for example, well-known AF, AE (automatic exposure processing), etc. is performed actuation of 1st step release switch 8a of step S18, and henceforth to actuation of 2nd step release switch 8b of step S24.

[0033] When an above-mentioned reference composition display is chosen, composition of a photographic subject image is set up, the automatic agreement judging of

composition is performed, and control of a single string which permits photography is performed. That is, if the image of reference composition information is overlapped on a photographic subject image, and is displayed on a finder thru/or an external monitor by a photography person's own actuation selection and 1st step release switch 8a is pushed after that (step S18), it will be confirmed whether reference composition is displayed on the finder etc. (step S20). When not displayed, directly, it progresses to step S24 and waits for actuation of 2nd step release switch 8b. Moreover, when reference composition is displayed, a photography person performs a double lump of the composition of the actual photographic subject image displayed on a finder thru/or an external monitor on real time to the reference composition (refer to drawing 3) by which it is indicated by superposition. The positional information of the both sides of the border line of the composition information on the photographic subject image of the real time at that time and reference composition information is incorporated by the judgment means 10 whenever [agreement], and progresses to judgment processing whenever [agreement / of step S21].

[0034] Drawing 4 is in the condition of the beginning of a lump [double], and is Screen G1 of reference composition. The location of the main photographic subjects in screen G2 ' of photographic subject image composition is H1. H2 Superposition screen G0 in the condition of having shifted It is shown. Drawing 5 is Screen G1 of reference composition at present. Screen G2 of the photographic subject image composition which is going to consider the double lump as the frame The gap condition of a frame is shown.

[0035] By judgment processing of the above-mentioned step S21, it is the reference composition screen G1 by the judgment means 10 whenever [agreement]. Composition screen G2 of an actual photographic subject image If having agreed as shown in drawing 6 is checked, having progressed and agreed to step S22 will be reported by voice thru/or display with the information means 6. At step S23, the signal of the record authorization to the record gate 11 is given by the system controller 7 so that record of actual photographic subject image data may be made to coincidence to a record medium 13, and it will be in the condition of the wait operation of 2nd step release switch 8b of step S24.

[0036] If 2nd step release switch 8b is pushed at step S24, the photographic subject video signal then outputted from the frame memory 5 will be recorded on a record medium 13 by compression/expanding processing circuit 12 as data with which compression processing was performed and compressed (step S25). The reference composition currently displayed on coincidence on the finder thru/or the external monitor disappears (step S26). In addition, after reference composition disappears, it returns to the photography recordable condition of the usual camera.

[0037] If whether composition information is already memorized checks for the composition information storage means 14 and it is memorized at step S27, this routine will be ended as it is. If composition information is not memorized, it progresses to step S28 and the photographic subject video signal outputted from a frame memory 5 is sent to the feature-extraction processing circuit 9. Binary-ized processing of threshold processing is made, and the photographic subject video signal inputted into the feature-extraction processing circuit 9 is stored in the composition information storage means 14 as reference composition information (step S29), and ends this routine.

[0038] In addition, the above-mentioned agreement judging processing in the above-

mentioned step S21 is not necessarily not required, superimposes reference composition and the photographic subject composition of the image of real time, and displays them on EVF18, while a photography person observes drawing 4 which shows the superposition screen, for example, the condition that composition has shifted, the composition of a photographic subject image adjusts, coincidence of reference composition as shown in drawing 6, and photographic subject image composition checks, and it may be made it shifting to photography.

[0039] As mentioned above, since the composition of the photographic subject which should carry out photography record can be determined observing [as explained in the camera of this example, superimpose and display on EVF etc. both the reference composition used as criteria and the image of the present photographic subject currently outputted to real time, and] the display screen, the exact composition which a photography person should mean can be set up. Moreover, the accuracy of visual decision of a photography person is necessarily less necessary by establishing a means to judge automatically agreement of the composition of reference composition information and a current photographic subject image.

[0040] Next, the camera of the 2nd example of this invention is explained. The camera of this example is a camera which two or more kinds of composition information is memorized for the composition information storage means 14, desired composition is taken out out of it to the ability to have treated only one reference composition with the camera of said 1st example, and it considers as reference composition information, and can set up the composition of a photographic subject image.

[0041] In addition, the fundamental configuration of this camera is shown in the block block diagram of drawing 1 like the camera of the 1st example. However, in this example, composition selecting-switch 8e as an information selection operating member is added to a control unit 8. The sign of other components presupposes that it is the same as that of the case of the 1st example. Moreover, it is the same as that of the example shown in drawing 3 - drawing 6 also about the example of a superposition display of reference composition and the composition of a photographic subject image. About the decision of photography composition, and the flow chart of photography processing, the amount of the first portion differs to drawing 2, and the flow chart of the different part is shown in drawing 7.

[0042] In the camera of this example, when a camera is in the condition in which photography record is possible (movie through), the reference composition display selection processing by step S12 and the composition display switch 8c actuation to 13 and 14 is the same as that of the flow chart of said drawing 2. When composition information was memorized by the composition information storage means 14 with the check of step S13 and it is distinguished, it progresses to step S31 of drawing 7, and the actuation condition of composition selecting-switch 8e is checked, and when operated, in step S32, the reference composition information on desired is chosen out of two or more kinds of reference composition information memorized by the composition information storage means 14. The multi-picture features which display two or more reference composition information on EVF18 or the external monitor 19 in list as the method of selection here are performed, and the approach of choosing desired reference composition, the approach of performing a time-sharing display and choosing desired reference composition, etc. are mentioned. When this composition selecting-switch 8e is not operated, processing below display processing of return and reference composition is performed to step

S15 of the flow chart of drawing 2 as it is.

[0043] Return and the selected reference composition are displayed on step S15 of drawing 2 on a finder thru/or an external monitor following step S32 (refer to drawing 3). Then, the processing as processing of the camera of said 1st example that processing not more than step S16 is also the same is performed. That is, it can specify whether the reference composition information in which it is indicated by current by composition elimination switch 8d is eliminated. When elimination is chosen, the reference composition information memorized by the composition information storage means 14 is eliminated. And when an elimination switch is not operated, the usual camera actuation, for example, well-known AF, AE, etc. are similarly processed before actuation of 2nd step release switch 8b henceforth from 1st step release switch 8a actuation.

[0044] As mentioned above, since a setup of the composition of a photographic subject image of having corresponded to two or more composition patterns immediately can be performed besides the effectiveness of said 1st example in the camera of this example as explained, it further becomes easy to use.

[0045]

[Effect of the Invention] Since the composition of the photographic subject which should carry out photography record can be determined according to the camera of this invention according to claim 1, referring to reference composition by making a graphic display means indicate both the reference composition using the composition information used as criteria, and the video signal of the photographic subject outputted now by superposition, the exact composition which a photography person should mean can be taken.

[0046] According to the camera of this invention according to claim 2, by establishing a judgment means to judge agreement of the reference composition using composition information, and the composition of a current photographic subject, a photography person does not need the accuracy of decision by viewing using a graphic display means, but, moreover, exact composition is acquired. According to the camera of this invention according to claim 3, it can recognize easily that photographic subject composition agreed with the reference composition using composition information with an information means.

[0047] According to the camera of this invention according to claim 4, by the record control means, a photography person's failure, for example, the composition which is not meant, can be recorded, and it can prevent the storage capacity of a record means decreasing etc. According to the camera of this invention according to claim 5, the complicatedness of graphic display means actuation is lost and superposition display actuation of a photography person becomes simple. According to the camera of this invention according to claim 6, it can respond to all composition patterns immediately.

[0048] According to the camera of this invention according to claim 7, time and effort and derangement with the unnecessary photography person for rewriting of composition information are avoidable. According to the camera of this invention according to claim 8, ***** time and effort and derangement of the photography person for elimination of composition information are avoidable. According to the camera of this invention according to claim 9, the check of the photographic subject composition over reference composition becomes easy on a graphic display means.

[0049] According to the camera of this invention according to claim 10, when

composition information is the video signal of a predetermined photographic subject, the component of the agreement judging with the video signal of the photographic subject by which the current output is carried out becomes easy. According to the camera of this invention according to claim 11, since composition information is the description information extracted from the video signal of the photographic subject based on predetermined composition, the accumulated dose of the data stored in a composition information storage means can be made small. According to the camera of this invention according to claim 12, the complicatedness of the display screen of a graphic display means is lost, and it becomes easy to carry out agreement actuation of the composition by the photography person.

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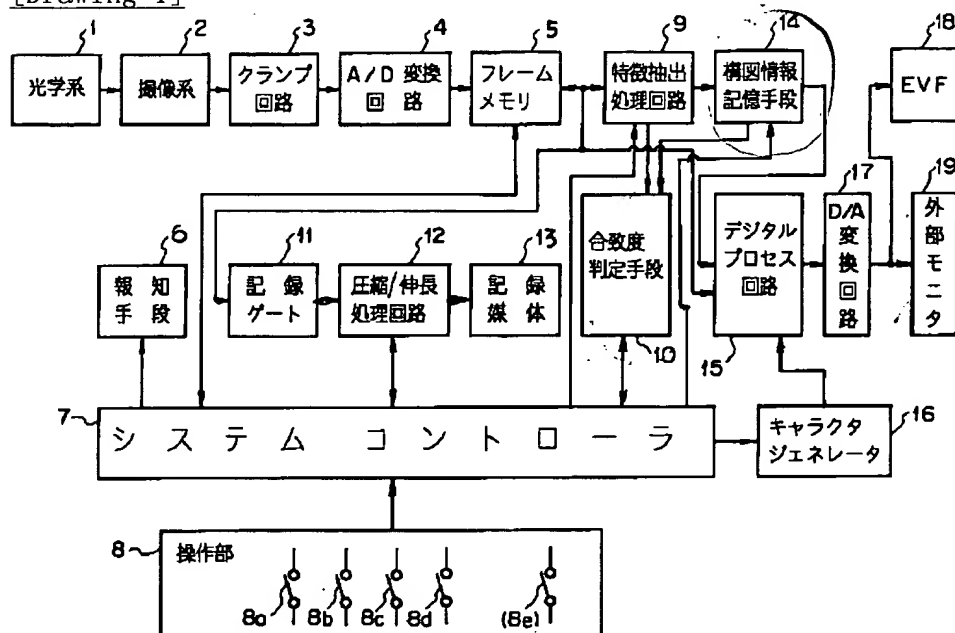
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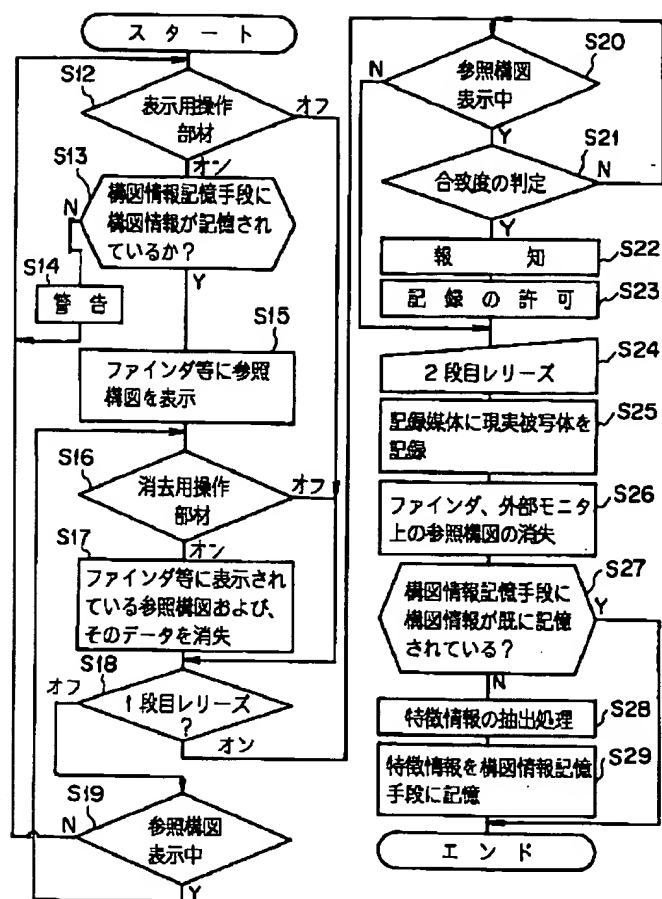
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DRAWINGS

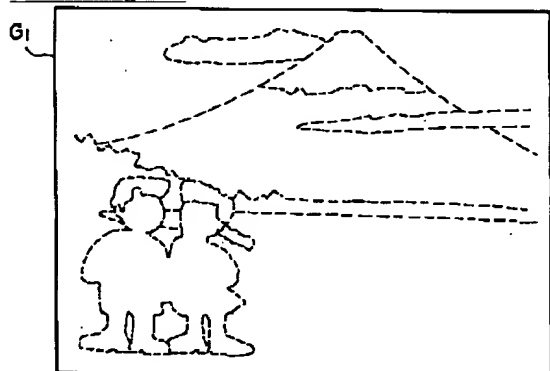
[Drawing 1]



[Drawing 2]



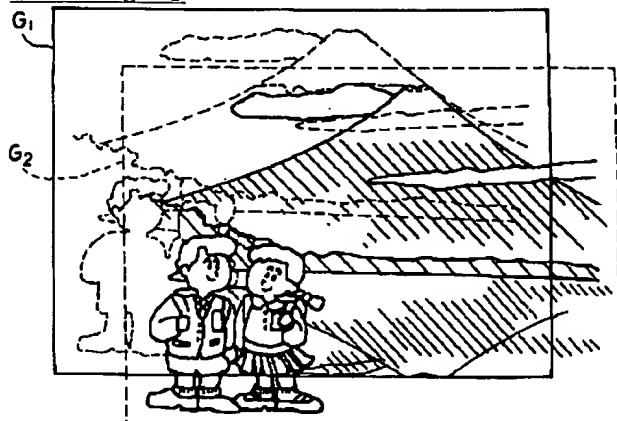
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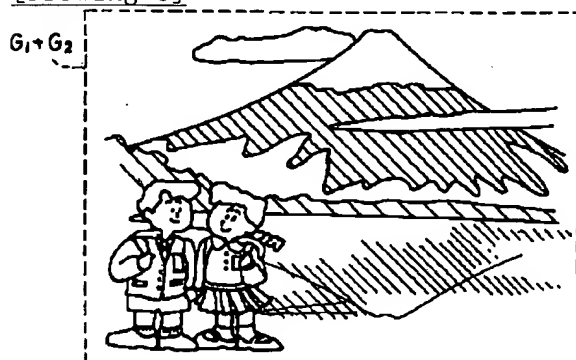
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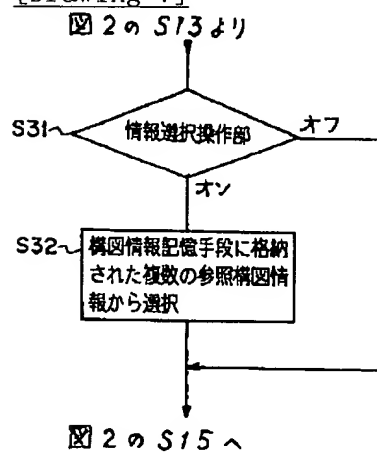
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]